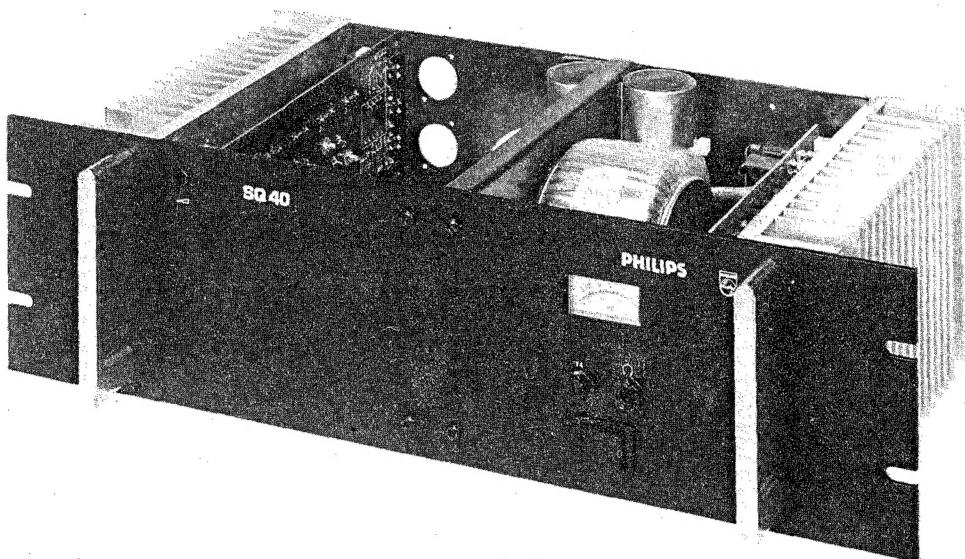


# Service Manual

LBB 1303 LBB 1304  
LBB 1305 LBB 1307

## Power Amplifiers



4822 733 24128

JULY 84



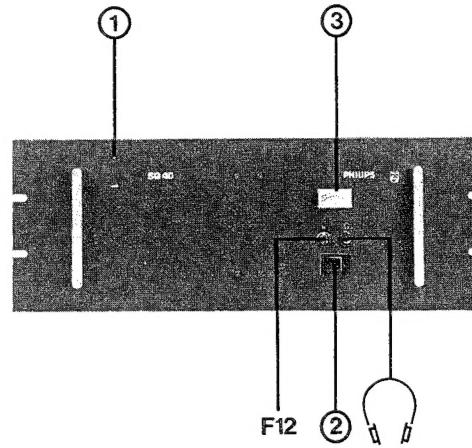
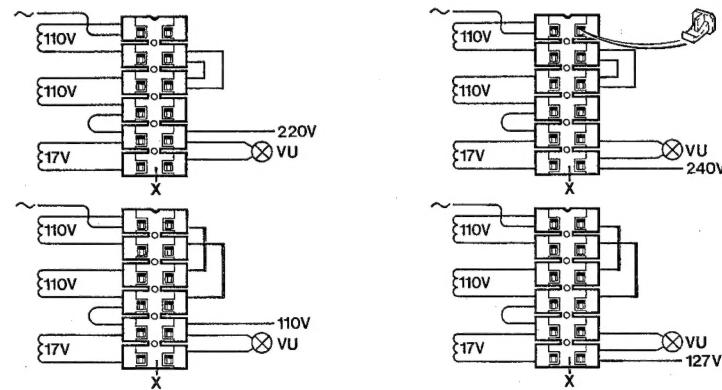
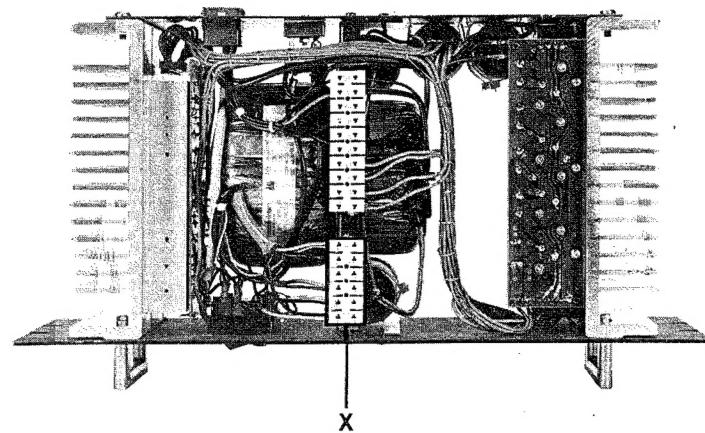
# PHILIPS

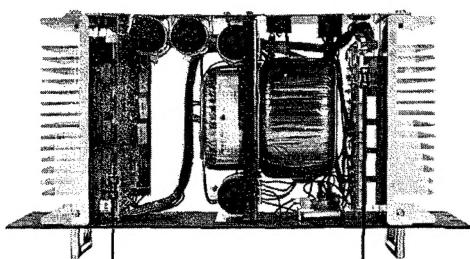
100W POWER AMPLIFIER LBB 1303 mains operated

150W POWER AMPLIFIER LBB 1305 battery operated

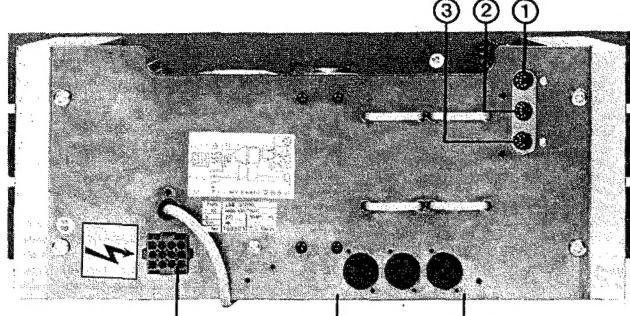
200W POWER AMPLIFIER LBB 1304 mains operated

400W POWER AMPLIFIER LBB 1307 mains operated

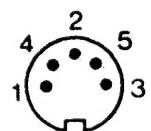




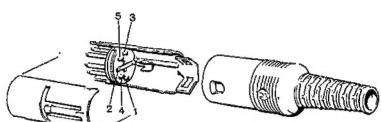
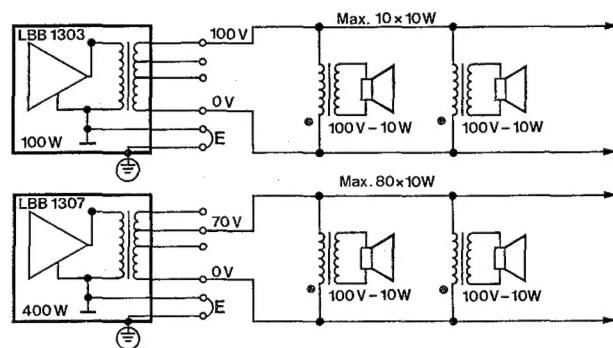
F1 pcb A



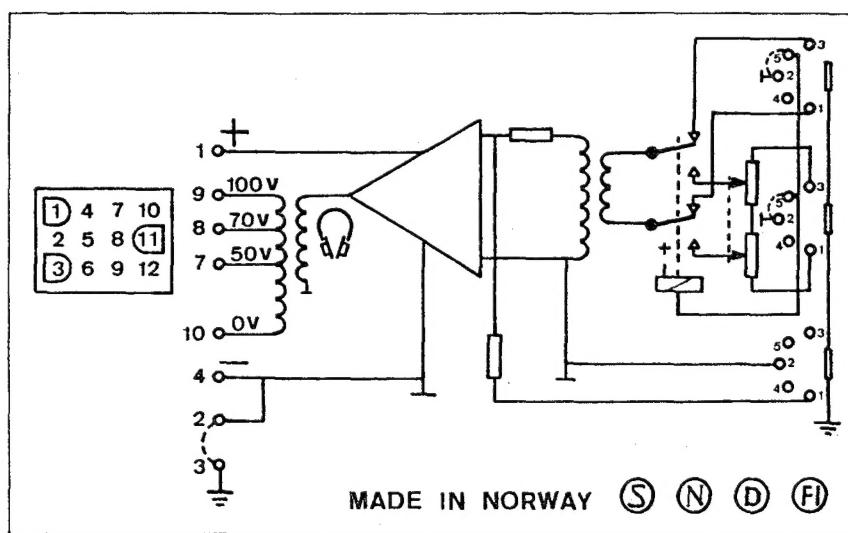
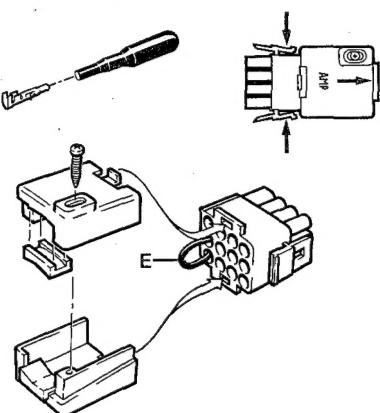
F81 pcb B



Mate-N-Lok      XLR



5-pole 180° DIN



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3. INSTALLATION AND OPERATION

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7. CIRCUIT DIAGRAM

LAY OUT PRINT BOARD

1.

GENERAL

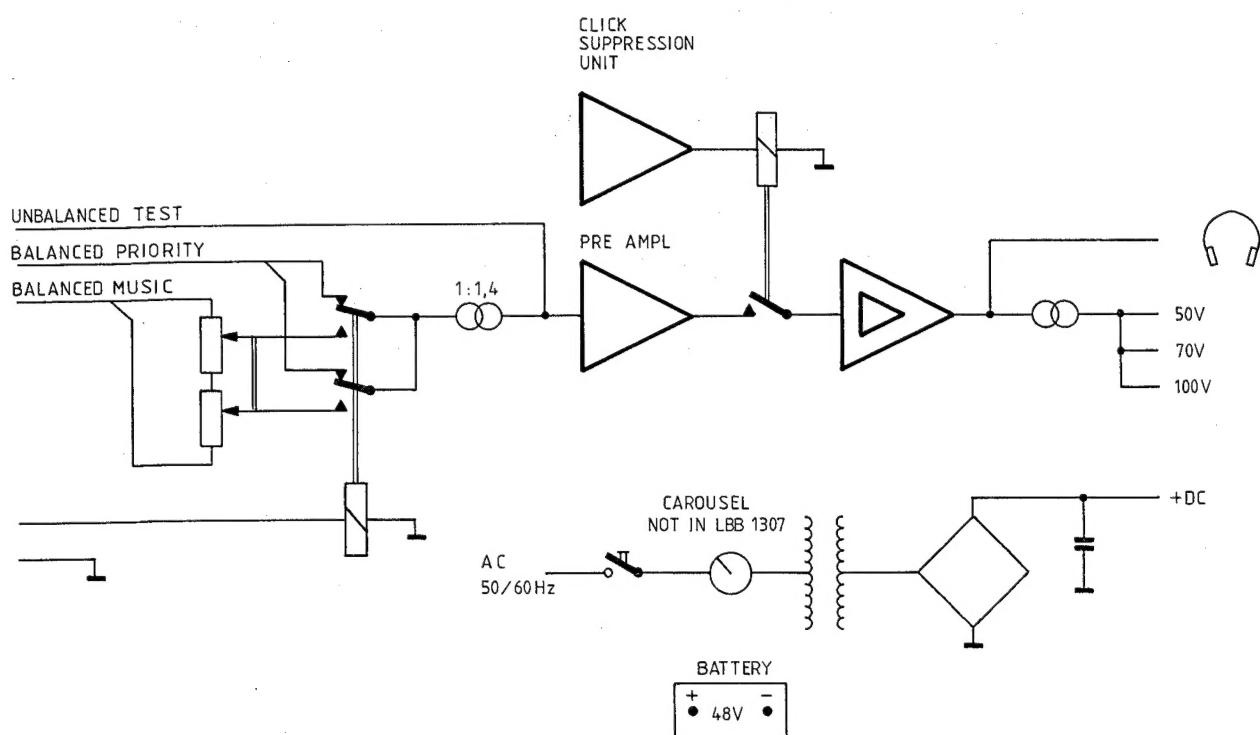
The LBB 1303/1305/1304/1307 is a high qualified 100W/150W/200W/400W mono a.c./d.c. Power Amplifier specially made for reinforcement purposes and suitable for 19" rack mounting.

**Remark:**

The LBB 1305 is only suitable for d.c. +48V operation.

1.1

BLOCK DIAGRAM



2.

TECHNICAL DATA

	LBB 1303	LBB 1305	LBB 1304	LBB 1307
	100W	150W	200W	400W
<u>Construction</u>				
19" rack mounting				
3HE	x	x	x	
4HE				x
<u>VU indicator</u>				
Indicates the voltages before output transformer				
0 mark is 40V ± 0,5dB on 100V at 1 kHz	x	x	x	x
<u>Connectors</u>				
<u>Input:</u>				
Three 5-pole 180° DIN sockets and three spare holes for XLR sockets.	x	x	x	x
<u>Output:</u>				
12-pole MATE-N-LOK connector				
<u>For</u>				
100V      70V      50V outputs	x	x	x	x
100 ohm    50      ohm 25      ohm	x			
67 ohm     33      ohm 25      ohm		x		
50 ohm     25      ohm 12,5      ohm			x	
25 ohm     12,5    ohm 6,3      ohm				x
1 headphone socket on front panel 6,3mm				x
<u>Fuses</u>				
Fuse holder in front of the Amplifier Fig. 3 F12 and on the A/B PCB boards Fig. 4 F1-F81. The Supply transformer has a self restoring thermal fuse Klixon (non replacable).	x	x	x	x
<u>Note:</u> The thermal cut-out operates on the primary winding of the mains transformer and although the pilot lamp in the VU meter extinguishes, the full mains voltage is still present inside the amplifier.				
<u>Values</u>				
220/      110/      PCB boards d.c.				
240Va.c.   127Va.c.				
T 2,5A     T 5A      T 5,0A      x				
T 5 A      T 10A     T 5,0A				x
T10 A     T 20A     T 5,0A				x
	T 5,0A			

**LBB 1303/1305/1304/1307**

LBB 1303	LBB 1305	LBB 1304	LBB 1307
100W	150W	200W	400W

Mains voltage

All amplifiers are delivered ready for use on 220V mains voltage. Max. deviation  $\pm 10\%$  50/60Hz mains voltage can be changed by rotating carousel for 110V, 127V and 245V except LBB 1307A.

x x see circuit diagram (fig. 1-2)

Power consumption

Rated power output (and  $+ 10\%$  mains voltage)

260VA	x		
265VA (+48Vd.c.)		x	
520VA		x	
880VA			x

Weight approx. 9,2 kg

8,5 kg	x		
12,4 kg		x	
18,3 kg			x

Distortion

At rated power for all  
Amplifiers THD at  
1 kHz  $< 0,5\%$

x x x x

Output impedance

100V tap	70V tap	50V tap	
17 ohm	8,5 ohm	4,25 ohm	x
12 ohm	6,5 ohm	3,5 ohm	x
8,5 ohm	4,25 ohm	2,1 ohm	x
3 ohm	115 ohm	0,75 ohm	x

Protection

The output is protected against any misloading and short circuiting

x x x x

Signal-to-noise

$> 85\text{dB}$  at rated power on 100V tap unweighted 20 - 20000Hz source impedance 2 kOhm preset control fully open

x x x x

Frequency response

at rated power - 10dB  
50 - 20000Hz - 3dB

x x x x

LBB 1303	LBB 1305	LBB 1304	LBB 1307
100W	150W	200W	400W

Input and interconnections

1 symmetrical music input (by activating one contact to earth of relay K1)  
 2 symmetrical priority input  
 3 asymmetrical test input

x	x	x	x
---	---	---	---

Input impedance  $\geq$  10 kOhm  
 For rated power input sensitivity on priority input 500mV (-3,8dBm)  
 max. input 3V (+12dBm) on music input.

x	x	x	x
---	---	---	---

External d.c. supply

All Power Amplifiers can be supplied with +48Vd.c.  
 Note: the LBB 1305 can only be supplied with d.c. voltage.

x	x	x	x
---	---	---	---

Suppression

Amplifier is provided with a click suppression circuit.

x	x	x	x
---	---	---	---

Working ambient temperature  
 $-10^{\circ} - +45^{\circ}\text{C}$

x	x	x	x
---	---	---	---

## 3.

INSTALLATION AND OPERATION

## Battery supply

The amplifier is prepared for an emergency external battery supply of +48V. The battery supply is connected via the Mate-N-Lok connector on the rear panel. See fig. 5. A protection circuit is incorporated to prevent any damage to the amplifier which may otherwise be caused by inadvertent reversal of the battery supply polarity.

## Note:

Even when operated from external batteries, it is still advised, because of the presence of high voltage, to earth the amplifier.

## Earthing

On delivery the electrical and mechanical earths of the amplifier are not connected together. When an amplifier is used alone, the electrical and mechanical earths should be joined together by linking poles 2 and 3 on the Mate-N-Lok connector on the rear panel. A wire link complete with Mate-N-Lok terminals is supplied on delivery.

## Earthing amplifier combinations

When two or more amplifiers are used in a system, it is necessary to ensure that earth loops and the associated problem of hum on the output signal are not introduced by the earth wiring. In this case,

terminal 2 on all amplifiers should be linked together and joined by one wire link to terminal 3 on one amplifier only.

#### Cooling

To ensure adequate cooling of all units mounted in a 19" rack when there is no spacing between units and when there is no forced air cooling, only the following numbers of amplifiers should be mounted together:

LBB 1303/00 100W : max. 4 units  
LBB 1304/00 200W : max. 4 units  
LBB 1307/00 400W : max. 2 units

These limitations are based upon an output power of -8dB nominal, an ambient temperature of +45°C, and a mains supply voltage of 242V.

#### Connections

##### Inputs

See fig. 5.

###### 1. Priority input

5-pole 180° DIN socket  
Pole 1 : Signal core  
Pole 2 : Electrical earth screen  
Pole 3 : Signal core  
Pole 4 : not connected  
Pole 5 : Remote control

###### Note:

Music input activated by shorting poles 2 and 5. Priority input activated with poles 2 and 5 not connected.

###### 2. Music input

5-pole 180° DIN socket  
Pole 1 : Signal core  
Pole 2 : Electrical earth screen  
Pole 3 : Signal core  
Pole 4 : not connected  
Pole 5 : Remote control

###### Note:

Priority input activated with poles 2 and 5 not connected. Music input activated with poles 2 and 5 connected.

###### 3. Test signal input

5-pole 180° DIN socket  
Pole 1 : Test signal core  
Pole 2 : Return core (screen)  
Poles 3, 4: not connected  
and 5

##### Outputs

###### 4. Output terminal block

12-pole Mate-N-Lok (see fig. 5)  
Pole 1 : +48V External battery supply  
Pole 2 : Electrical earth  
Pole 3 : Mechanical earth

Pole 4 : -0V External battery supply  
 Pole 5 : not connected  
 Pole 6 : not connected  
 Pole 7 : 50V Loudspeaker output  
 Pole 8 : 70V Loudspeaker output  
 Pole 9 : 100V Loudspeaker output  
 Pole 10 : 0V Loudspeaker output  
 Pole 11 : not connected  
 Pole 12 : not connected (prepared for the "A" wire of a 100V system)

Headphone socket (see fig. 3)  
 6.3mm standard jack socket

Controls (see fig. 3)

1. Sensitivity control pre-set for input 2
2. Mains on/off switch
3. Output level VU-meter plus illuminated scale (mains on)  
 (replacement lamp - Philips type 8097D, E10, 20V, 0.1A  
 - Service code no. 4822 134 40015)

Loudspeakers for 100, 70 or 50V system (see fig. 6)

Loudspeakers with suitable matching transformers can be connected in parallel to the 100V, 70V or 50V output so that the total loudspeaker power does not exceed the nominal output power rating of the amplifier. 100V loudspeakers connected to the 100V output will consume their nominal power. If, however, 100V loudspeakers are connected to the 70V output, then the loudspeaker's power consumption will be equal to one half of their nominal rated power. This means that twice as many loudspeakers (all having the same nominal power rating) can be connected without overloading the amplifier.

Similarly, if 100V loudspeakers are connected to the 50V output they will only consume a quarter of their nominal power and an increase of up to four times as many loudspeakers as possible.

In-phase connection of loudspeakers

Disturbing effects can occur, particularly when loudspeakers are mounted close together, which are caused by the loudspeakers being connected in anti-phase. To ensure an in-phase connection, all similarly marked loudspeaker terminals (in most cases one terminal is marked with a red dot) must be connected to the same wire on the distribution cable. See fig. 6.

Parallel connection of amplifier inputs

The pre-amplifier output, of, for example, a mixing amplifier, may be connected to the input of this amplifier and to the input of several other power amplifiers. Public Address system arrangements of practically any wattage can be built by using this method of connection.

### Connectors

Fig. 7 3 x 5-pole 180° DIN plugs

Fig. 8 1 x 12-pole Mate-N-Lok connector

On delivery, the amplifier is supplied with a small plastic bag containing a 12-pole Mate-N-Lok block complete with contact pins and cable clamp plus a contact pin ejector tool. Also included is a wire link for interconnecting the electrical and mechanical earths.

When fitting the contact pins to the external wiring, they may be either soldered or crimped.

## 4.

### CIRCUIT DESCRIPTION

The Power Amplifier has 3 inputs:

1. Balance transformer priority input
2. Balance transformer input which can be adjusted with a preset potentiometer on the front of the unit
3. Direct input, only used for test procedures

From the input connector the signal is fed, via transformer T1, to amplifier IC1 and then to the differential transistors TS3 and TS4. In front of TS3 and TS4 a relay contact is provided to avoid clicks from the loudspeakers when switching on and off. Comparator IC2 drives TS2 to operate relay K2. When the power goes on TS1 conducts and point 3 of IC2 becomes higher in voltage than point 2, so point 5 is then a + voltage and TS2 is non conducting. In the meantime, C10 is charging. The voltage on point 2 rises above point 3. At that moment, the voltage on point 5 changes from positive to negative and TS2 can conduct. Relay contact of K2 connects the signal to TS3 and TS4. When the power goes off, C10 discharges via R10 so that relay K2 drops out faster than the discharging of the main capacitors.

During the warming up of the amplifier TS6 is thermally connected with the output stage and protects against too much variation in the quiescent current. After a few minutes R28 can be adjusted for the final cross over point. When, for any reason, the output current increases too much, the voltage between the base and emitter of TS7 will rise to the value of 0,6V. The transistor TS7 can conduct and decrease the output voltage of the power transistors. The recovery time of the protection circuit is delayed by capacitor C17 and D11 and D13. The output of the amplifier is connected to an output transformer with 50V, 70V and 100V taps. The loudspeaker output connector BU18 is a multipole MATE-N-LOK type and provides connections for the loudspeakers, earth and battery operation. A VU indicator on the front of the unit is present to indicate the output voltage of the amplifiers. The VU indicator which is driven via a rectifier circuit is adjustable by means of potentiometer R47. A headphone jack B17 on front of the unit is also available.

## 5.

REPAIRING METHODS

When the Power Amplifier does not work we suggest the following checks are made:

## 1. Check fuses

If there is one blown, first disconnect amplifier from mains supply then unplug the board and disconnect the board from the mains heatsink, take care about the grease for the power transistors. The grease is removable with freon.

2. Measure with an ohmmeter between the emitter and collector of the power transistors, and the driver transistors TS9, TS10 and TS5.

## 3. Measure with an ohmmeter diodes D15, D16.

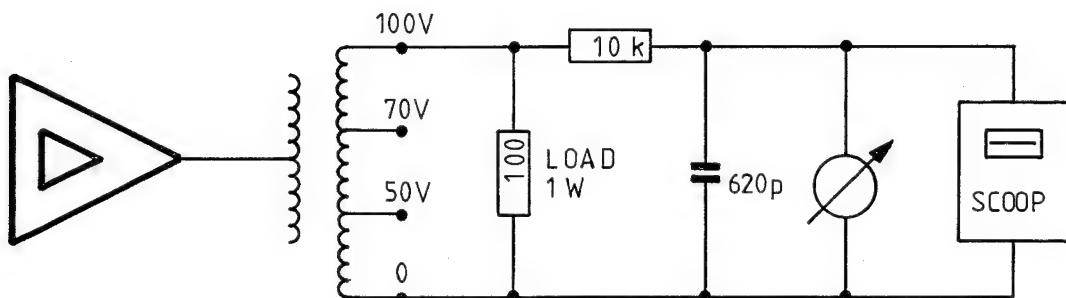
Most of the time they are short circuit.

After repairing connect only the A-PCB board on the main heatsink, use sufficient grease for the power transistors, increase slowly the mains supply by using a variac. Observe the current consumption. This should be less than 0,5 Amp. When the mains supply is at full voltage, load and check the amplifier by sending a signal through the amplifier. Connect the B-PCB boards and follow the same procedure as before. Adjust the quiescent current by turning R28 and check the maximum power on the amplifier.

Measurements

## Signal-to-noise

To measure the S/N ratio use in front of the measuring equipment a fixed tap to be sure that no high frequency interference disturbs the final results.



Quiescent current

Load the amplifier with the existing loudspeakers or a resistance of e.g. 100 ohm/1W on the 100V tap. Without signal adjust by means of R28 6mV across R52 = 0,47 ohm, or 30V on point 7 on the diagram and earth or 16mA in series with R52 which can be measured on the fuse points, after removing the fuse. With signal apply 1kHz for 10V output on the 100V tap. Distortion THD must be < 0,5%.

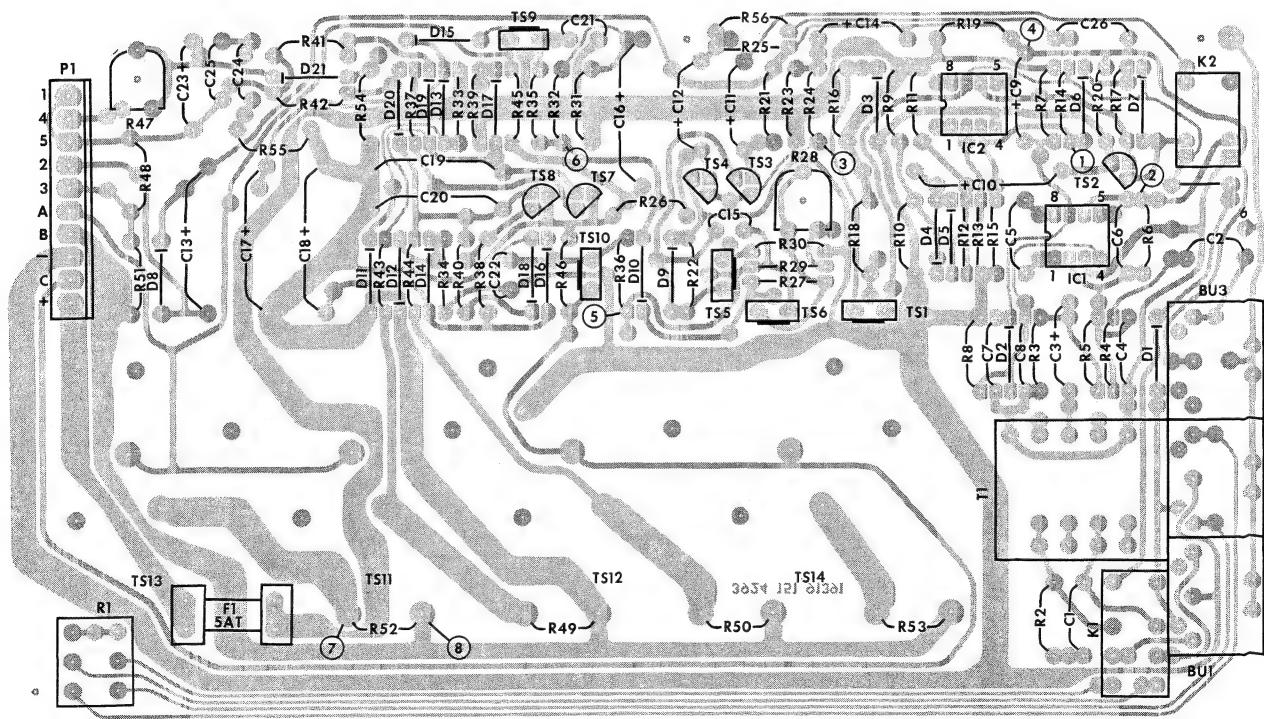
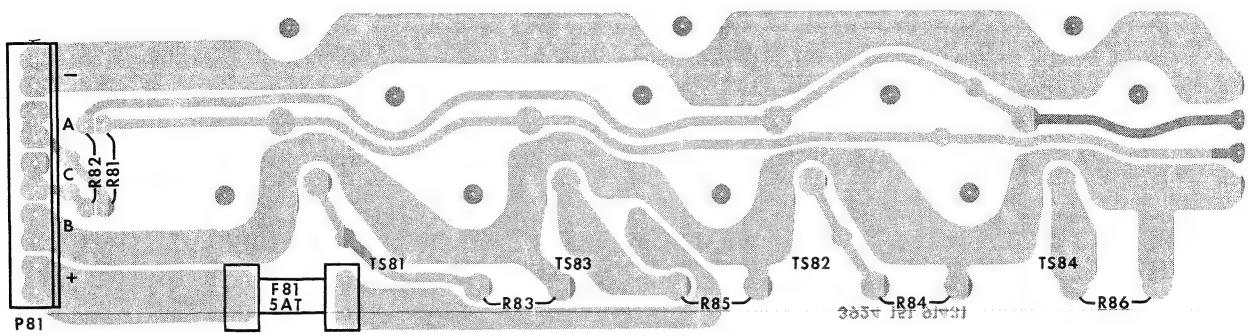
The level for the VU indicator can be adjusted by means of R47 on the printed circuit board.

6.

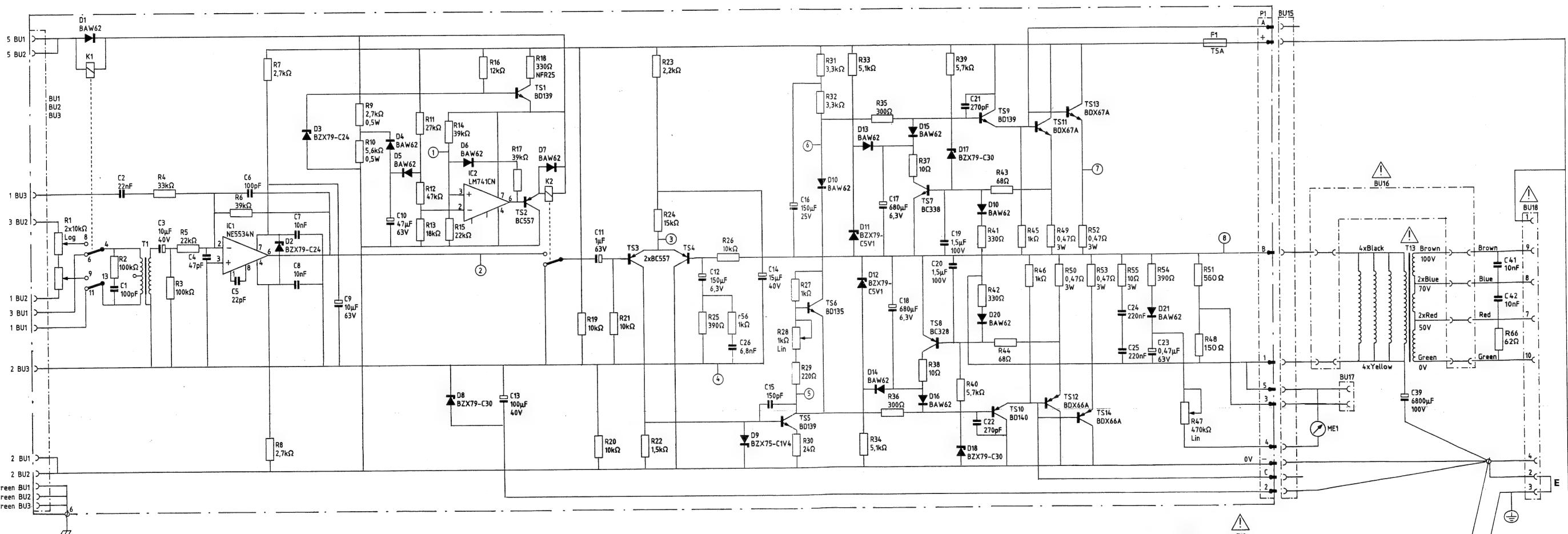
PARTS LIST

Service code	Description	Item
<u>19" Rack</u>		
4822 347 10027	VU meter	ME1
4822 255 10007	Lampholder for ME1	
5322 256 34019	Fuse holder	on Front Panel
5322 256 30247	Fuse holder set	on Front Panel
5322 267 50471	12 pole connector MATE-N-LOK	on Rear Panel
5322 321 14048	Mains Cord	
5322 267 40524	Jack holder	BU17
5322 277 10761	Mains switch	S1
5322 140 60255	Mains transformer 1303	T12
5322 140 60256	Mains transformer 1304	T12
5322 140 60257	Mains transformer 1307	T12
5322 140 60258	Output transformer LBB 1303	T13
5322 140 60261	Output transformer LBB 1304	T13
5322 140 60259	Output transformer LBB 1305	T13
5322 140 60262	Output transformer LBB 1307	T13
5322 130 32374	LED LBB 1305	LD1
5322 282 50017	Thermostat LBB 1305	S3
<u>Amplifier print board</u>		
4822 124 20708	Capacitor 10UF	40V C3
4822 124 20728	Capacitor 10UF	63V C9
4822 124 20733	Capacitor 47UF	63V C10
4822 124 20722	Capacitor 1UF	63V C11
4822 124 20672	Capacitor 150UF	6,3V C12
4822 124 20715	Capacitor 100UF	40V C13
4822 124 20709	Capacitor 15UF	40V C14
4822 124 20703	Capacitor 150UF	25V C16
4822 124 20674	Capacitor 680UF	6,3V C17/18
4822 121 42031	Capacitor 1,5UF	100V C19/20
5322 101 34033	Potentiometer 2 x 10klog	R1
4822 116 52438	Resistor 5k6	0,5W R10
4822 116 52452	Resistor 10k	0,5W R19/20
4822 100 10037	Trimmer 1k	LIN R28
4822 116 52407	Resistor 220E	0,5W R29
4822 116 52437	Resistor 5k1	0,5W R33/34
4822 116 52414	Resistor 300E	0,5W R35/36
5322 116 54214	Resistor 10E	0,5W R37/38
4822 116 52416	Resistor 330E	0,5W R41/42
4822 100 10107	Trimmer 470k	LIN R47
5322 115 40225	Resistor 0,47E	3W R49-R53
4822 116 51795	Resistor 680E	0,5W R51
5322 115 40226	Resistor 10E	3W R55
4822 267 40325	Socket DIN 5P	180° BU1-3
4822 130 34398	Diode BZX79	C24 D2/3
4822 130 34328	Diode BZX79	C30 D8
4822 130 34047	Diode BZX75	C1V4 D9
4822 130 34233	Diode BZX79	C5V1 D11/12
4822 130 34328	Diode BZX79	C30 D17/18
4822 253 30029	Fuse 5A	F1
5322 280 70236	Relay RY-24W	K1

Service code	Description	Item
5322 280 70237	Relay	MZ 24 NS
5322 148 80193	Transformer input	T1
5322 209 86285	Op. Amp.	NE5534
4822 209 80617	Op. Amp.	UA741TC
4822 130 40823	Transistor	BD139
4822 130 44256	Transistor	BC557
4822 130 40824	Transistor	BD140
4822 130 44121	Transistor	BC338
4822 130 44104	Transistor	BC328
5322 130 42262	Transistor	BDX69A
5322 130 42261	Transistor	BDX68A
<u>Booster Print board</u>		
4822 253 30029	Fuse	5 Amp.
5322 115 40225	Resistor	0,47E 3W
5322 130 42262	Transistor	BDX69A
5322 130 42261	Transistor	BDX68A



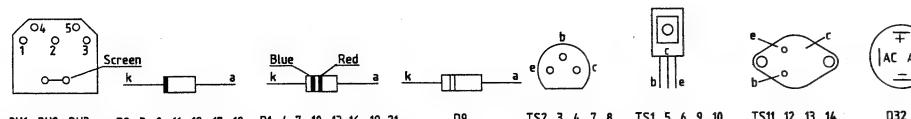
C1-C15	1 2 3 4 5 6 7 8 9 10	13.	11	12	14. 15	26	16	17 18	19 20	21. 22	24. 25 23	36	37 39	41 42
C16-C41														
R1-R30	1 2 4. 3 5 6 7. 8 9. 10 11-13 14. 15 16 17 18 19 20 21 22 23. 24 25 26					27-30								
						56		31 32 33 34 35. 36 37. 38 39 40 41. 42 43. 44 45. 46 49. 50 52. 53 55 54 47 51 48						
R31-R66								10 11. 12. 13. 14 15. 16 17. 18 19. 20				21	32	
D1-D32	1 2 3 4 5 8 6 7 1. 2 3 4 5 6 7. 8 9. 10 11. 12. 13. 14													
TS1-TS14														



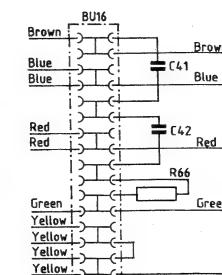
BU1 = Alarm input  $500\text{mV}_{\text{rms}}$ ,  $R_i > 10\text{k}\Omega$

BU2 = Music input  $500\text{mV}_{\text{rms}}$ ,  $R_i > 10\text{k}\Omega$

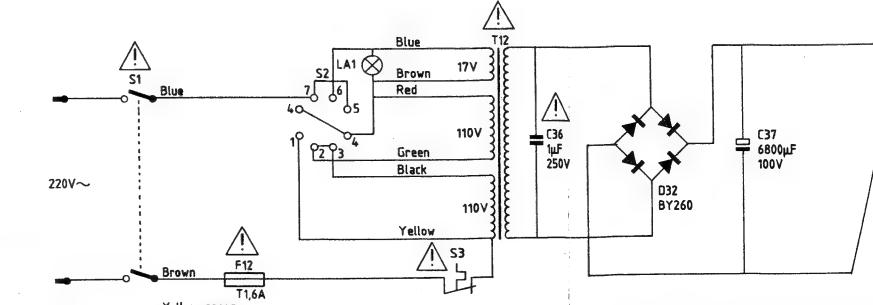
BU3 = 20kHz monitor input

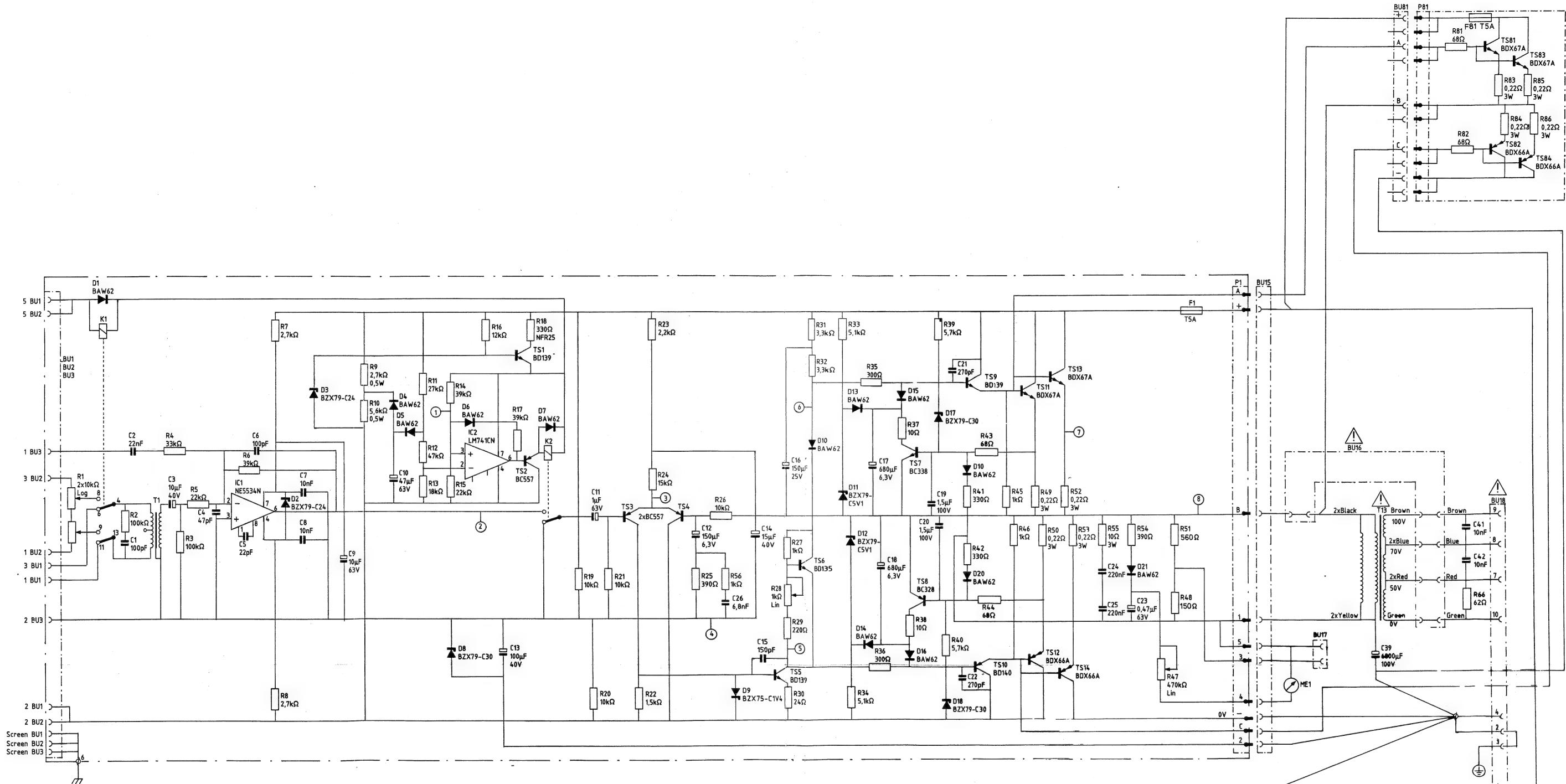


BU1, BU2, BU3  
Bottom view



- ① + 7,2V
- ② + 30V
- ③ + 31V
- ④ + 30V
- ⑤ + 29V
- ⑥ + 32V
- ⑦ + 30V 16mA
- ⑧ + 30V

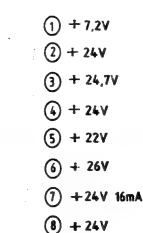
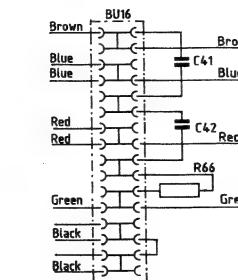
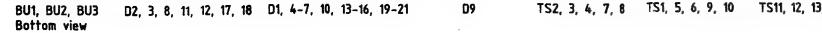
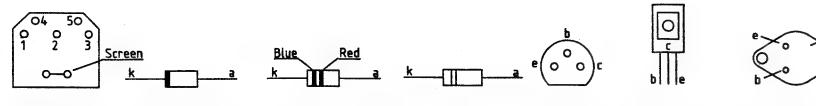


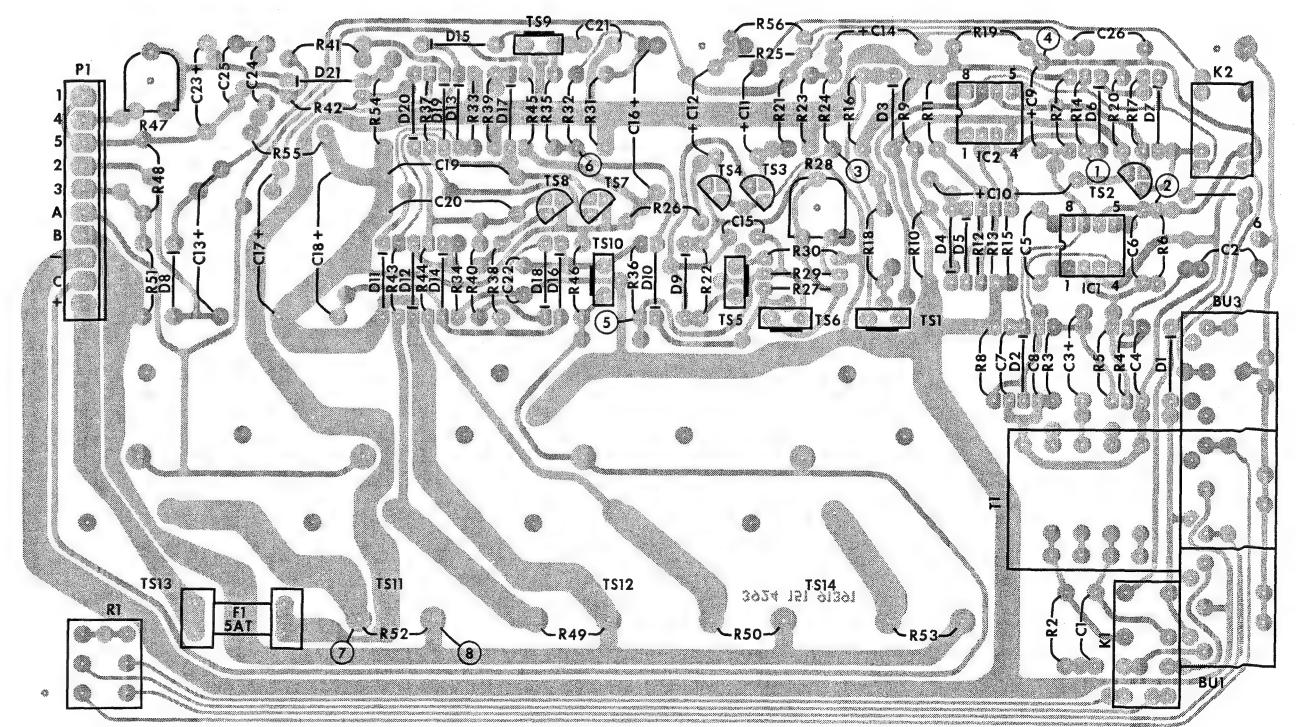
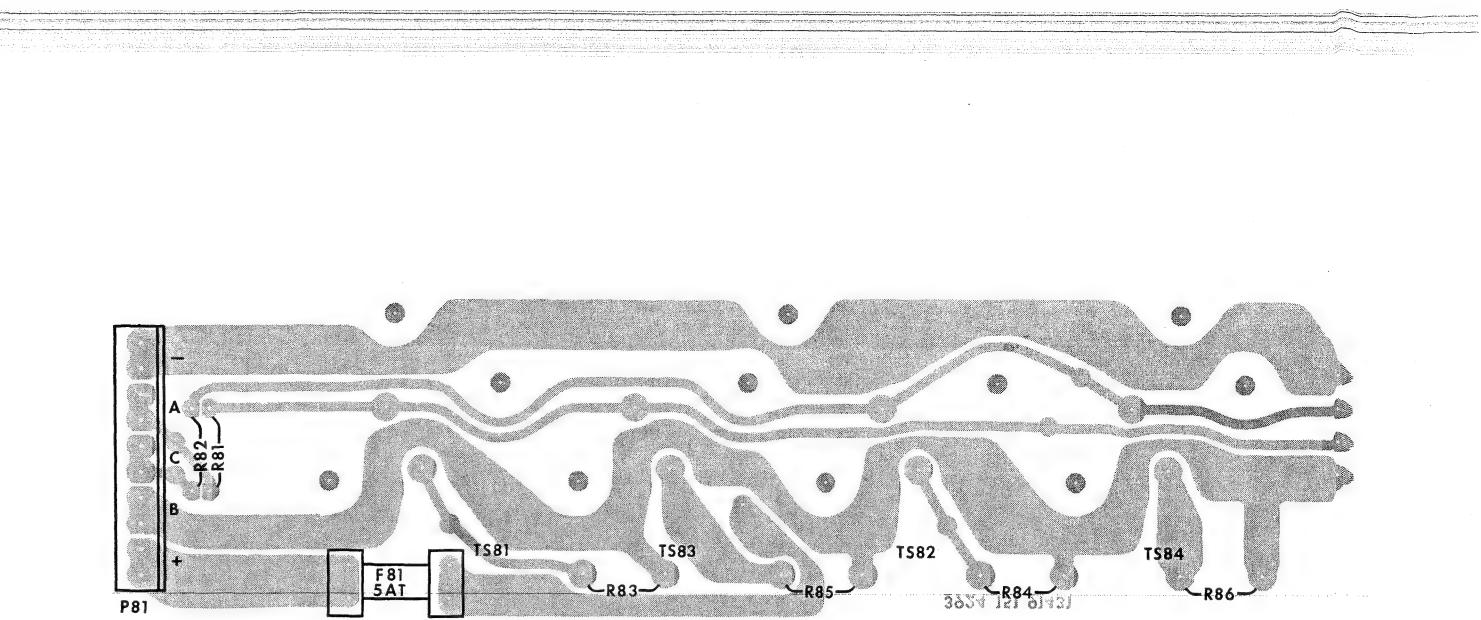


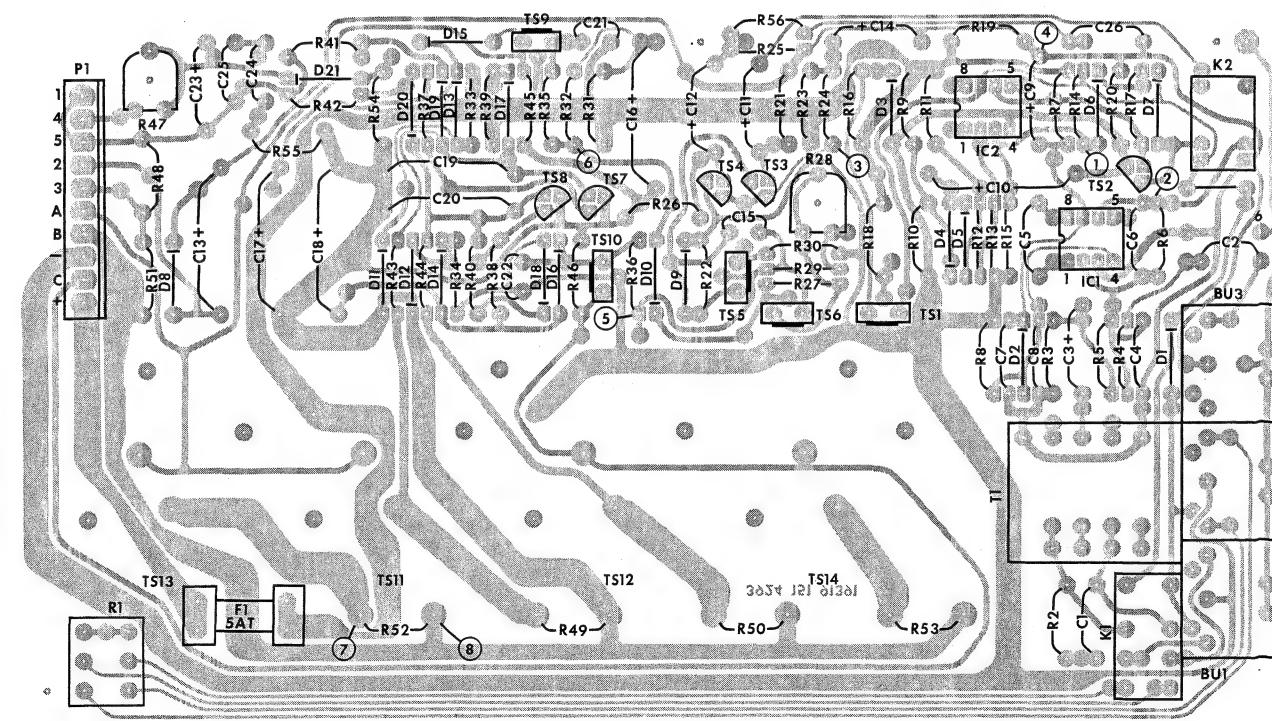
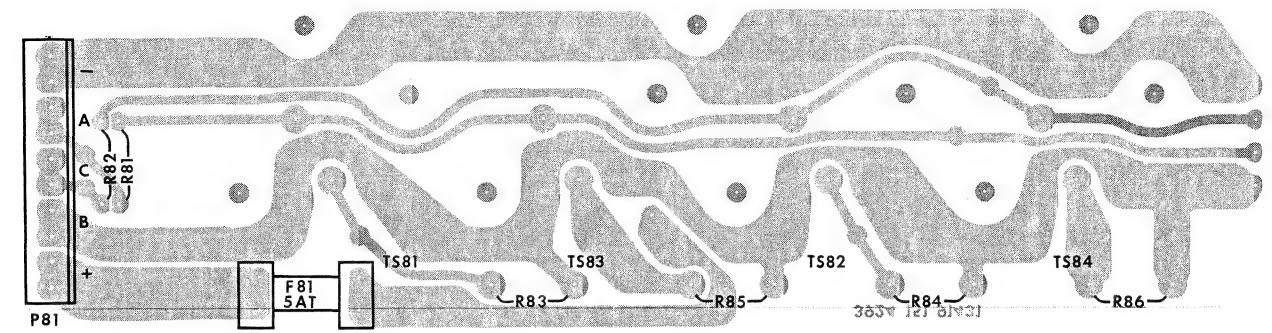
BU1 = Alarm input 500mV<sub>rms</sub>, R<sub>i</sub> > 10kΩ

BU2 = Music input 500mV<sub>max</sub>, R<sub>i</sub> > 10kΩ

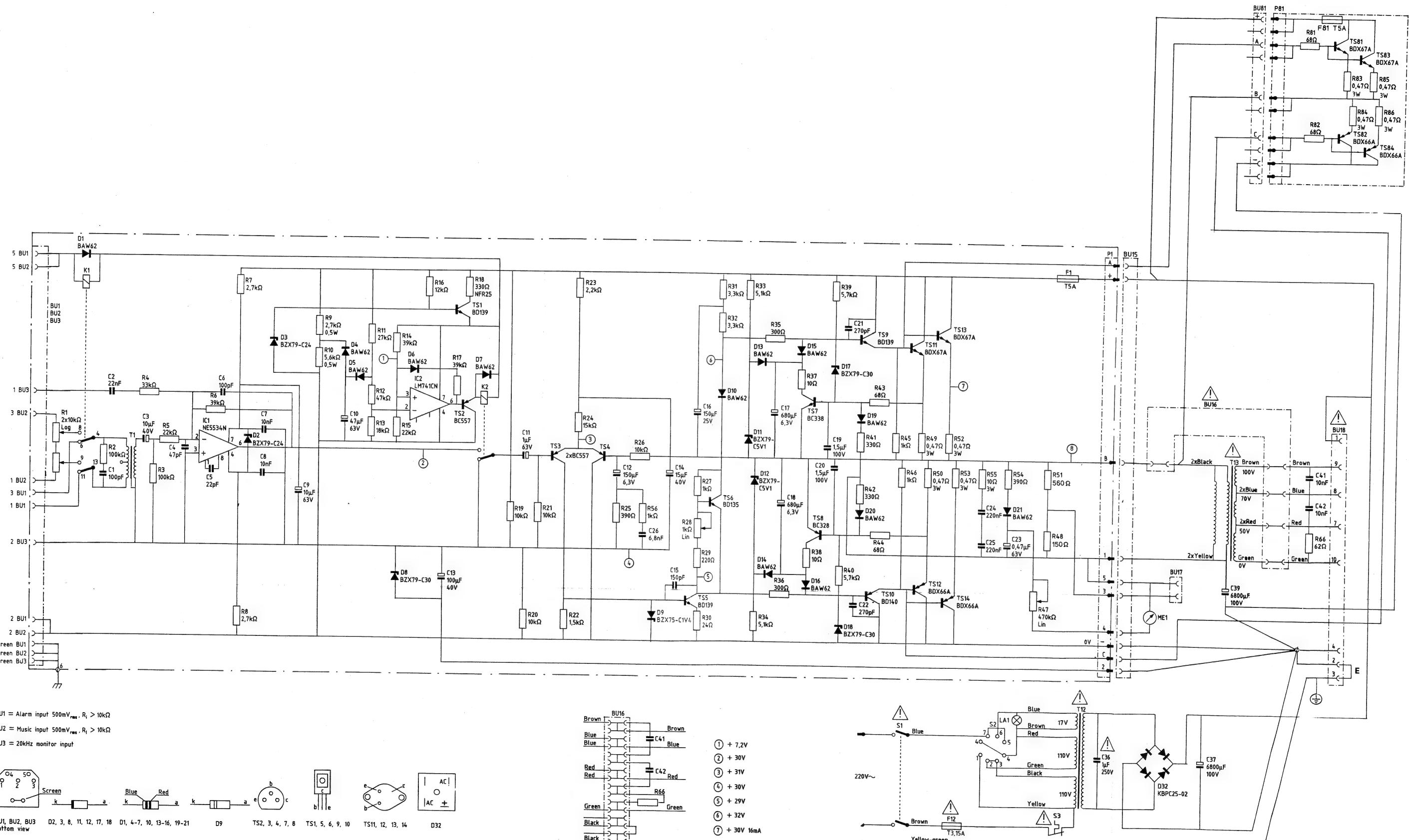
BUS = 20kHz monitor input



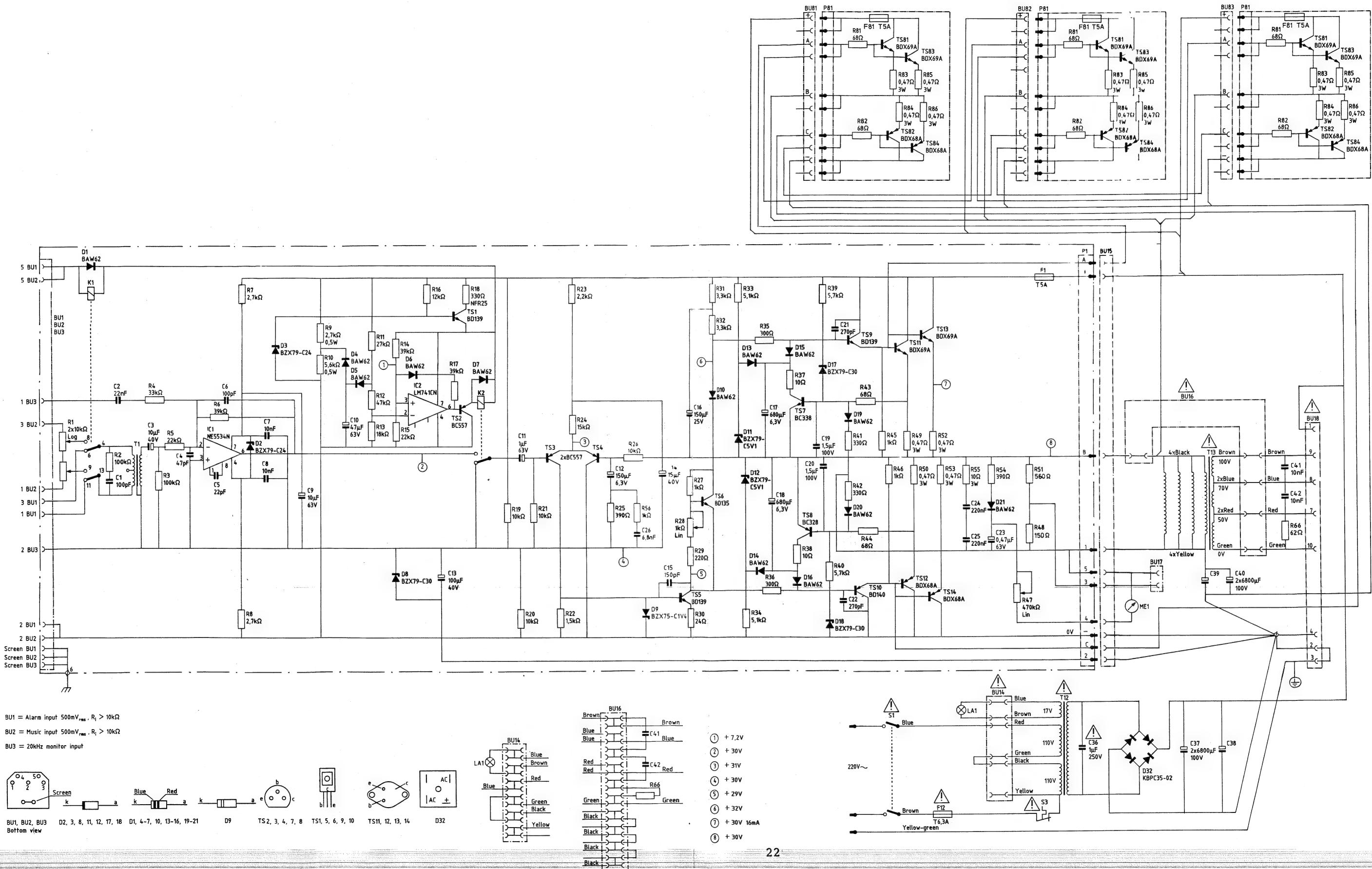


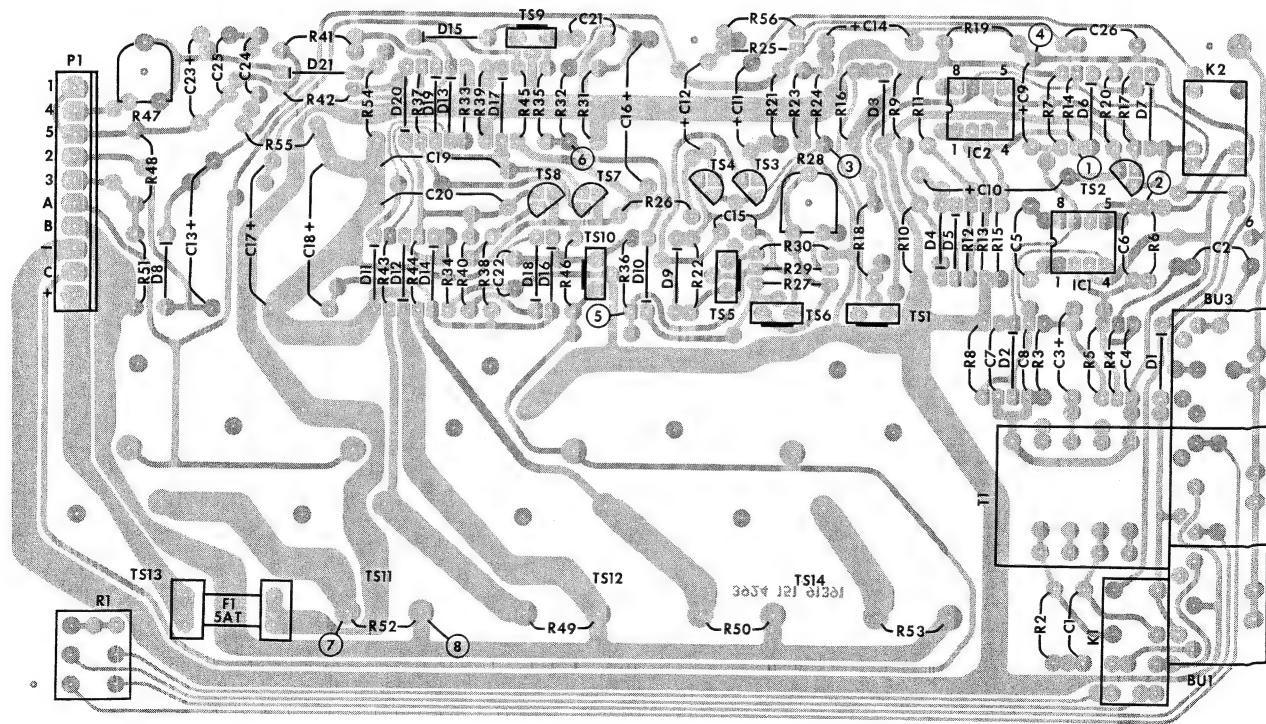
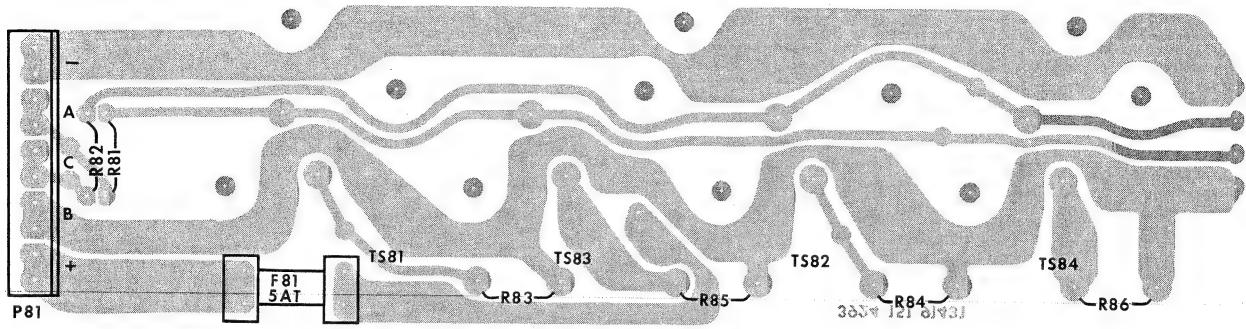


C1-C15	1 2 3 4 5 6 7.8 9 10 13 11 12 14-15	26 16 17.18 19.20 21.22 24.25 23 36 37 39 41.42
C16-C41	4.3 5 6 7.8 9.10 11-13 14.15 16 17 18 19 20 21 22 23 24 25 26 27-30	56 31.32 33.34 35.36 37.38 39.40 41.42 43.44 45.46 49.50 52.53 55 54 47 51.48 66
R1-R30	1 2 4.3 5 6 7.8 9.10 11-13 14.15 16 17 18 19 20 21 22 23 24 25 26 27-30	39.40 41.42 43.44 45.46 49.50 52.53 55 54 47 51.48 66
R31-R66		
R81-R86		
D1-D32	1 2 3 4 5 8 6 7 9 10 11.12.13.14 15.16 17.18 19.20 21 32	24.25 23 36 37 39 41.42 81.82 83.84 85.86
TS1-TS14	1.2 3 4 5 6 7 8.9 10 11.12.13.14 15.16 17.18 19.20 21 32	81.82 83.84 85.86
TS81-TS84		81.82 83.84



C1-C15	1	2	3	4	5	6	7	8	9	10	13	11	12	14	15														
C16-C41																													
R1-R30	1	2	4.3	5	6	7	8	9.10	11-13	14	15	16	17	18	19	20	21	22	23.24	25	26	27-30							
R31-R66																					56	31 32	33.34	35.36	37.38	39.40	41.42	43.44	45.46
R81-R86																						55	54	47	51.48				
D1-D32	1	2	3	4	5	8	6	7	9	10	11.12	13.14	15.16	17	18	19.20													
TS1-TS14									1.2	3	4	5	6	7	8	9.10	11.12	13.14											
TS81-TS84																						81.82	83.84	85.86					





# Service Service Service

## Information

electro acoustics division

Philips Export B.V.  
Eindhoven, The Netherlands

cat.	DOCUMENTATION CHANGES	NR. DC061	date 26.02.19 85
art. gr.	PUBLIC ADDRESS	nr. PA015	rev. sheet 1 of 1

Product : AMPLIFIERS LBB 1303, 1304, 1305 and 1307

Service manual : 4822 733 24128

Reason : The above mentioned service manual has to be corrected as below.

Contents : 1. In the block diagram 1.1. The relay coil is by mistake drawn as if it is internally connected to earth. This must be the positive supply voltage.

2. In the technical data (2.) the following AC fuses must be altered:

T 2.5 A must be T 1.6 A  
T 5 A must be T 3.15 A  
T 10 A must be T 6.3 A  
T 20 A must be T 15 A

The DC fuse remains T 5.0 A and for the service code numbers see point 4 of this information.

3. For adjusting the quiescent current and checking the distortion (page 12). The following instructions are correct:

- Connect the 100 V tap of the amplifier to the existing loudspeakers or to a 100 ohm/1 W resistor.
- Adjust without input signal R28 causing 8 mV across, or 7 mA through R52 (0.47 ohm).
- Checking the distortion. Connect a 1000 Hz signal and adjust it so that there is 10 V output on the 100 V tap. Distortion THD must be 0.5%.

4. On the service parts list (page 13):

Altered:

Capacitor C12 = 150  $\mu$ F 6.3 V must be 68  $\mu$ F 6.3 V code number 4822 124 20672.

Added:

Cap. C37 6800 $\mu$ F/100 V	5322 124 40814
S4 Thermal fuse over R13 (LBB 1307 only)	5322 252 20127
Transistor TS11/13 BDX 67	5322 130 42349
Transistor TS12/14 BDX 66	5322 130 44742
Fuse T 1.6 A	4822 253 30024
Fuse T 3.15 A	4822 253 30027
Fuse T 5 A	4822 253 30029
Fuse T 6.3 A	4822 253 30031
Fuse T 15 A	4822 253 30033

G. v.d. Waals



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## Service Information

Advanced Automation Systems  
Audio-communications  
Broadcast Equipment  
Electronic Security & Recording Systems  
Industrial Automation  
Scientific & Analytical Equipment  
Test and Measurement

Industrial &  
Electro-acoustic  
Systems  
Division

cat. DOCUMENTATION CHANGES	nr. DC079	DC004PA016	date 08.11.1985
art. gr. PUBLIC ADDRESS	nr. PA016		rev. sheet 1 of 5

**Product** : POWER AMPLIFIER LBB 1303/00, 1304/00, 1305/00, 1307/00

**Service Manual** : 4822 733 24128

**Reason** : Technical and appearance alterations. To indicate these alterations, the /00 should be changed into /01.

**Contents** : 1. The original versions of the SQ40 range which have black front panels have been superseded by updated versions with beige coloured front panels and brown handles.

2. New fuse values for /01 and /00.

	F12	220/240 V	code number	110/127 V	code number
LBB 1303		2.5 A	4822 253 30026	5 A	4822 253 30029
LBB 1304		5 A	4822 253 30029	10 A	4822 253 30032

3. Errata on service information DC061PA015:

Point 3b. Adjust without input signal R28 causing 8 mV across or 16 mA through R52 (0.47 ohm).

Point 4. Transistors TS11/13 BDX67 TS12/14 BDX66 have to be BDX67A and BDX66A.

4. New input sensitivities:

Priority and music input at 1 kHz and rated output:  
200 mV +/- 1 dB.

Test input at 20 kHz and rated output -3 dB:  
160 mV +/- 3 dB.

R6/C6 have to be changed from 39 kOhm into 91 kOhm,  
from 100 PF into 27 PF.

5. Signal to noise ratio: > 77 dB at rated input.

6. Adding diode D22. This diode prevents creepage current when more amplifiers are connected together via the interconnection point 5BU1, 5BU2.

# Service Information

Nr. DC079PA016

Sheet 2 of 5

7. Adding two connection points 5 and 6 for battery supply input on output terminal block 12-pole MATE-N-LOK.  
Battery supply: +/o 48 V  
Polarity on points 5 and 6: reversable  
Adding rectifier: D33 for LBB 1303/01 and LBB 1305/01  
Type: BY260 code number 5322 130 31492  
Rectifier: D33 for LBB 1304/01  
Type: KBPC 25-02 code nr. 5322 130 34587  
Rectifier: D33 for LBB 1307/01  
Type: KBPC 35-02 code nr. 5322 130 32375

G. Haselager

continued on page 3



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